Positioning the Drone: Policing the "Risky" Skies

by Sarah Jane Fox*

Drones: the means "to bring about and maintain permanent peace. . . ." (N. Tesla)[1]

1. *Introduction*

Defining what drones are is a constant issue that legislatures battle with,[2] alongside the ongoing question of how to police their developing use from a governance and legislative perspective.[3]

The name "drone" is frequently applied to this airborne machine, due to the droning sound stemming from the low and continuous buzz associated with its use. One of the earliest

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1 U.S. Patent No. 613,809 (filed July 1, 1898).

2 Sarah Jane Fox, *The Rise of the Drones: Framework and Governance – Why Risk It!* 82 J. Air L. & Com. 683 (2017). *See also* Joaquín Sarrión Esteve, *El Régimen Jurídico de la Utilización de los Drones. Una Aproximación Multinivel a la Legislación Europea y Española*, 12 Revista de la Escuela Jacobea de Postgrado 103–22 (2017); Joaquín Sarrión Esteve & C. Benlloch Domènech, *Rights and Science in the Drone Era. Actual Challenges in the Civil Use of Drone Technology*, 0 Rights and Science: R&S 117–33 (2017), https://rightsandscience.juri-dileyc.com/wp-content/uploads/sites/6/2017/10/J.-Sarrio%CC%81n.-C.-Benlloch.-Rights-and-science-in-the-drone-era.pdf; Joaquín Sarrión Esteve, *Actual Challenges for Fundamental Rights Protection in the Use of Drone Technology* (DroneLawChallenges, Working Paper No. 2, Aug. 27, 2018), https://ssrn.com/abstract=3239562.

3 Sarah Jane Fox, *Policing: Monitoring, Investigating and Prosecuting: Drones*, 6 Eur. J. Comp. L. & Governance 1 (2019).

references and definitions occurred in 1946, in the American magazine *Popular Science*, which recognized their potential to society, stating "[d]rones, as the radio-controlled aircraft are called, have many potentialities, civilian and military."[4]

Today, this definition would be viewed as far too simplistic; not least, it fails to fully identify the difficulties associated with not only defining them but the uses to which they can be applied.

The association with their military use has no doubt been a negative factor in utilizing drones in applications that potentially could benefit society from a civilian perspective. There is no doubt that accountability and transparency are key to securing "buy-in" from the public, but historic legacies undoubtedly remain a battle to also be overcome, none more so perhaps than when a drone is utilized by the police. In this respect, it is often interpreted that the police use is more akin to a military purpose rather than for the benefit of society. Societal skepticism of the police remains a contentious issue regardless of any technologies they utilize in their role.[5] So going forward, just what role will the police have in terms of policing and using drones?

We rarely question the use of cars in a policing capacity, or indeed the use of a police helicopter – so is it likely that we will accept the same frequent use of drones by the police as we enter the third decade of the 21st century? Or, is it a case that other global events could negatively influence and prevent the *police drone squad* from becoming a common practice?

This paper[6] explores the aspect of defining and positioning the drone and some of the associated "risks" of related and developing technology in terms of acceptance (of drones) by society. The international dimension, in regard to the International Civil Aviation Organization (ICAO), is also reviewed. Additionally, consideration is given to the positioning of the police within this

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4 *Grumman Hatches a Mallard*, Popular Sci., Nov. 1946, at 121, 122, https://books.google.com/books?id=_CADAAAAMBAJ&lpg=PA121&dq=Grumman%20Hatches%20a%20Mallard&pg=PA121#v=onepage&q&f=false [https://perma. cc/6MW8-QC7H].

5 Sarah Jane Fox, *Policing – The Technological Revolution: Opportunities & Challenges!*, 56 Tech. in Soc'y 69 (2019), https://doi.org/10.1016/j.techsoc.2018.09.006.

6 This paper does not seek to dissect existing legislation. The author makes clear reference throughout to her previous publications which have undertaken this and, therefore, the reader is directed toward these as part of a series of linked and ongoing research outputs.

equation, and while the primary focus concerns the United Kingdom (and additionally the European Union), some comparative discussion is undertaken between the U.K. and the United States.

Lessons learned from aviation are considered in a bid to determine the answer to the questions posed, and ultimately whether drones have the means "*to bring about and maintain permanent peace. . . .*"[7]

The discussions commence by providing some historical contextualization and associated definitions of drones.

2. *Yesterday's Sci-Fi – Today's Reality?*

Leonardo da Vinci, born in the 15th century,[8] was more than just a painter – he was a visionary and a scientist, who envisaged transferring nature's "life" into machinery. He is credited with the inventions of the parachute, helicopter, and tank – where transport and nature merge. There is no doubt that da Vinci was a polymath – a person of widespread exceptional genius. But the reality is that what he foresaw and envisaged would not have been accepted by the society of his day. Society evolves and what it can't accept today it potentially may do tomorrow. Take the fully automated car – potentially easier for society to accept than something which is automated and hovers above us. But even then, there remain questions as to whether technocrats have fully taken into account the concerns of the man and woman on the street.

Since the 16th century, governments have frequently looked to the public for innovation, offering financial incentives for inventions that could have a beneficial application to the greater society. Arguably, this could also be a means to encourage buy-in from the public for technology that is associated with their advancement and to which they have directly contributed.

From an aviation perspective, the British newspaper, *The Daily Mail*, in 1908 offered prize money in an incentive-based competition whereby a reward was offered to the first pilot to fly an aeroplane across the English Channel, a distance of nearly 38 km (21 miles) from the Calais region of France to Dover, En-

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7 U.S. Patent No. 613,809, *supra* note 1.

8 Leonardo da Vinci (1452–1519).

gland.[9] In 1909, this was achieved by the Frenchman, Louis Blériot, who became the first man to make the crossing in a "heavier than air" aircraft – the crossing having only been made previously by hydrogen balloons in 1784 and '85.[10]

As with its predecessor, the aeroplane, prize money of $1 million was offered in 2003 to anyone who could create an autonomous vehicle capable of negotiating a 240-kilometer course on land in the Mojave Desert.[11] In 2004, the first year of the challenge, all contenders failed to get further than 12km. However, a year later five vehicles crossed the finish line – setting into play a gold rush and increasing the scramble for driverless cars and the exploitation of this new technology, which would see such vehicles customarily occupying the roads. This said, the testing of such technology has arguably come at a price, with at least four fatal car collisions involving autonomous vehicles arising since 2016.[12] Like all transport modes, driverless cars carry a risk. Whether the negative risk outstrips the positive benefits remains to be seen. In many ways, this is one part of the battle associated with convincing a skeptical public that there is a market and, indeed, the need for such technology.

As Professor Peter Hancock identified, there are clear comparisons to be drawn from aviation, whereby:

> [E]xperience from aviation shows that as new automated systems are introduced, there is often an increase in the rate of adverse events. Though temporary, this potential uptick in the crash rate

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9 *The Wider View: 100 Years After Blériot First Flew Across the Channel, an Identical Plane Repeats the Feat (But Not Before the French Had Blocked the First Attempt)*, DailyMail.com (July 26, 2009, 5:47 AM), https://www.dailymail.co.uk/news/article-1202165/THE-WIDER-VIEW-100-years-Bleriot-flew-Channel-identical-plane-repeats-feat.html.

10 *Id. See also* Sarah Jane Fox, *'CONTEST'ing Chicago. Origins and Reflections: Lest we forget!*, 8 Int'l J. Private L. 73 (2015).

11 *See* Alex Davies, *An Oral History of the Darpa Grand Challenge, the Grueling Robot Race that Launched the Self-Driving Car*, Wired (Mar. 8, 2017), https://www.wired.com/story/darpa-grand-challenge-2004-oral-history/ (showing the link back to 2001, when the U.S. Congress demanded that a third of the military's ground combat vehicles be uncrewed by 2015. But when the defense industry was seen not to be quickly responding, the challenge was launched by Tony Tether, the director of Darpa.).

12 For statistics relating to fatalities on the roads (in the U.S.), see *Fatality Analysis Reporting System (FARS)*, Nat'l Highway Traffic Safety Admin., https://www.nhtsa.gov/research-data/fatality-analysis-reporting-system-fars (last visited Mar. 11, 2019).

> may cause concern for the general public and then politicians, lawmakers and even manufacturers – who might be discouraged from sticking with the new technology.[13]

So, while there is a concerted drive to push such technology to the forefront, there is more to be learned from comparing humans and automated vehicles and looking at the lessons from aviation. Although commercial jets frequently use autopilot systems today, there remains a need to keep experienced pilots in the cockpit – not least to reassure a flying public that the machinery and technology support the pilot (and not vice-versa).

From a road perspective, this may be a harder battle to undertake, for whereas commercial jets are monitored by air traffic controllers and given specific paths, a mixture of cars of various technological levels are set to run side-by-side. Therefore, it remains an unanswered question in terms of correctly gauging how driver-driven and driverless cars will mix together going forward. Compared with the current system used in the cockpit there is also a differing level of sophistication in the technology used between the jet plane and an automated car in terms of artificial intelligence and hence the degree of decision-making involved. This said, since 2017, frequent news stories have reported that Boeing is developing a fully-automated, intelligent (AI) system, or remotely controlled system with a pilot on the ground.[14] This would seem to mirror the system used by drones and hence bring closer together than ever before any distinction between a plane and a drone. However, the increased use of drones in the sky may also compromise the safety of traditional (and even AI-operated) aircraft.

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13 *Are Autonomous Cars Really Safer than Human Drivers?*, THECONVERSATION.COM (Feb. 2, 2018, 6:29 AM), https://theconversation.com/are-autonomous-cars-really-safer-than-human-drivers-90202.

14 *See, e.g.*, Brian Owens, *Will Passengers Ever Fly on Pilotless Planes?*, INSIDE SCI. (Oct. 24, 2017, 9:15 AM), https://www.insidescience.org/news/will-passengers-ever-fly-pilotless-planes; Jay Bennett, *Boeing Announces Study for Self-Flying Airliners*, POPULAR MECHANICS.COM (June 9, 2017), https://www.popularmechanics.com/flight/airlines/a26838/boeing-self-flying-airliners/; Jonas Elmerraji, *Self-Flying Aircraft Are Coming Before Autonomous-Driving Cars*, THESTREET.COM (Aug. 9, 2018, 2:53 PM), https://www.thestreet.com/investing/self-flying-aircraft-are-coming-before-autonomous-driving-cars-14679298.

3. *Developing Technology – Defining a Drone: Risks and Protection*

Classifying and defining what a drone is has been a constant challenge,[15] and with newer technology this is likely to become even more complex. Plus, concurrently, there are issues regarding acceptance as to the circumstances when a drone should or could be used, and the associated terminology that should be applied.

Applying overly simplistic definitions, such as those referred to by Villasenor, who said that "a drone is an unmanned aircraft that can fly autonomously," can result in other questions arising.[16] For example, in this definition it would have to be questioned as to what exactly is meant by an unmanned aircraft. There remains a massive range in terms of shapes, sizes, and capabilities that could characterize a drone – and the imagery of a model aircraft is therefore both misleading and outdated.[17]

As, stated, "[*C*]*ategorizing drones . . . is engulfed in a myriad of different opinions and perspectives. . . .*" Not least, "*what to refer to this 'machine' as in the first place!*"[18]

The definitions below provide the more commonly used words and abbreviations which appear in differing publications and sources[19]:

- Drone – much favored by the French; for example, the French Directorate for Civil Aviation (DGAC);
- RPA/S (Remotely Piloted Aircraft or Remotely Piloted Aircraft System) – used mostly by international and national aviation agencies;

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15 Fox, *supra* note 2.

16 John Villasenor, Op-Ed., *What Is a Drone, Anyway?*, SCIENTIFICAMERICAN.COM (Apr. 12, 2012), https://blogs.scientificamerican.com/guest-blog/what-is-a-drone-anyway/. John Villasenor is a non-resident senior fellow at the Brookings Institution and a professor of electrical engineering at UCLA.

17 While drones come in a variety of formats, there are but two broad categories: (1) fixed wing; and (2) rotary wing. Most light drones are of the rotary-wing type, with four, six, or eight sets of rotors, with a common format being the quadcopter, a helicopter that is lifted and propelled by four rotors. The quadcopter can be used to carry a camera (which may have a wireless data link to the ground. This would allow real-time surveillance to be carried out at minimum cost.). *See* Fox, *supra* note 2.

18 *Id.*

19 When referring to websites and citing documents, the definition, as contained within the source, is predominately used within this paper. Outside of this, reference is made to the word "drone" for consistency.

- UA (unmanned aircraft) – cited within EU (proposed) legislation;
- UAS (Unmanned Aerial System) – still largely used by the U.S. (and U.K.); and
- UAV (Unmanned Aerial Vehicle) – mostly used as a general reference (alongside drone) by the general population.

The EU summarized these definitions with the following guidance:

> Unmanned aerial system (UAS), of which the unmanned aerial vehicle (UAV) is the airborne component, comprising two fundamental types: Remotely-Piloted Aircraft Systems (RPAS), a class of UAS which has a 'pilot' operating the Remotely-Piloted Aircraft (RPA) from a Ground-Control Station (GCS); and UAS with no remote pilot, or autonomous air vehicles. In this document, the term 'drone', essentially a layman's term, refers to all types of UAS.[20]

Nevertheless, despite this, various words seem to be used interchangeably on many occasions.

In 2014, the EU identified that there were already more than 1,700 different types of drones produced by official manufacturers (with approximately one-third made in the EU), and today it is likely that this number under-represents the developments since this time, not least of those drones being personally made and/or modified by unregistered and unrecognized sources.[21]

And, in respect to defining what was meant by "autonomously," Villasenor added, "*without a human in control.*"[22] Even this description of "something" that is controlled outside of a human remains interesting and arguably alarming to many, too – not least in terms of litigation and liability. It also raises the potential of an AI controlling a drone, which would no doubt be a likely and predictable development given the previous discussions in relation to autonomous automobiles and the airplane.

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20 SESAR, European Drones Outlook Study: Unlocking the Value for Europe (Nov. 2016), https://www.sesarju.eu/sites/default/files/documents/reports/European_Drones_Outlook_Study_2016.pdf.

21 Press Release (Memo), Eur. Comm'n, Remotely Piloted Aviation Systems (RPAS) Frequently Asked Questions, Memo 14/259 (Apr. 8, 2014), http://europa.eu/rapid/press-release_MEMO-14-259_en.htm.

22 Villasenor, *supra* note 16.

The use of an RPA/S (Remotely Piloted Aircraft or Remotely Piloted Aircraft System), however, tends to imply an earlier level of technology, which clearly cites a pilot as having control, and, in this respect, it is assumed that the pilot remains a human. The earliest recorded use of an unmanned aerial vehicle (UAV) is said to have occurred in 1849 – when it is reported that unmanned balloons, not under a person's control, were used in warfare against the enemy. Two hundred balloons were said to have been launched by Austria to attack Venice. These balloons were alleged to have carried 33 pounds of explosives having half-hour time fuses. This idea is attributed to an Austrian artillery lieutenant named Franz von Uchatius.[23] The later 1899 Hague Convention, recognizing this potential, forbade balloons being used for aerial bombing.[24]

The carriage of passengers is also linked to the use of hot air balloons. Coming notably before their use in warfare, the late 18th century was witness to the first manned experiment of flight. There is evidence that, in 1784, a French lieutenant issued the first directive, to the effect that a balloon must not be operated within the limits of Paris, without first seeking police approval. Hence police and flight first became linked and the police undertook the role of policing the skies.[25]

3.1. *Risk*

In this instance, there was foresight as to the possible negative consequences of basic devices that flew in the skies above persons and property and which were particularly at the mercy of the wind. With their operation came potential risks, not only to the

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23 *Who Invented Drones?*, UAV Sys. Int'l, https://www.uavsystemsinternational.com/who-invented-drones/ (last visited Mar. 11, 2019).

24 Declaration (IV, 1), to Prohibit, for the Term of Five Years, the Launching of Projectiles and Explosives from Balloons, and Other Methods of Similar Nature, July 29, 1899, 32 Stat. 1839 (entered into force Sept. 4, 1900; expired Sept. 4, 1905). The First Hague Peace Conference adopted three Conventions and three Declarations, the first of which prohibited the launching of projectiles and explosives from balloons or by other similar new means. It should be noted that this was only a temporary measure (lasting 5 years). *See* Sarah Jane Fox, *The Evolution of Aviation: In Times of War and Peace – Blood Tears and Salvation!*, 31 Int'l J. World Peace 49 (2014); Fox, *supra* note 10 (making reference to the International Committee of the Red Cross, https://ihl-databases.icrc.org/ihl/INTRO/145).

25 Fox, *supra* note 10.

operator and passenger, but to those on the ground as well as the property below. The need to be approved before use, albeit by the police, could be seen as a proactive response aimed at providing some type of accountability and governance system, particularly aimed at protecting third parties – persons and property.[26]

In 1822, prediction as to the potential for risk emanating from aviation was realized when the earliest record of a judicial decision in the field of air law was recorded. In this instance it occurred in New York, in the U.S. case of *Guille v. Swan*.[27] The case related to the fact that Guille's balloon had landed out of control on a vegetable garden belonging to Swan. This incident, together with the actions of the curious onlookers who rushed to help, caused damage to Swan's garden and fence. The Court found that Guille was liable (regardless of fault) for the damage caused by the balloon and also the damage caused by the crowd.

It is acknowledged that everyday living carries a magnitude of risk, and none perhaps more so than that associated with our movement – particularly when and where transport is involved.[28] While it remains difficult to eliminate all risks, a sense of protection is applied to minimize it or at least to provide some type of assurance should the potential of that risk-foreseen situation be realized.

Societal risk is able to be classified into four main types[29]:

- Individual or "real" risk, as determined on the basis of the circumstances and as considered after their full development;
- Statistical risk, which is determined by analyzing available data relating to incidents and accidents directly relating to the concern;
- Predicted risk, which may be based upon relevant historical studies and analytical modelling; and

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26 Peter H. Sand, Geoffrey N. Pratt & James T. Lyon, An Historical Survey of the Law of Flight (1961).

27 Guille v. Swan, 19 Johns 381 (N.Y. 1822). The case is also instrumental as a source of law regarding the application of torts.

28 Sarah Jane Fox, *"Mobility and Movement Are 'Our' Fundamental Rights" . . . Safety & Security – Risk, Choice & Conflict!*, 17 Issues Aviation L. & Pol'y 7 (2017).

29 Andrew P. Sage & Elbert B. White, *Methodologies for Risk and Hazard Assessment: A Survey and Status Report*, 10 IEEE Transactions on Sys., Man, & Cybernetics 425 (1980) (Further discussed in Sarah Jane Fox, *Safety & Security: The Influence of 9/11 to the EU Framework*, 45 Res. in Transp. Econ. 24 (2014).

- Perceived risk, which is the perception of a risk to an individual, whether said to be intuitive or otherwise.

However, what is often forgotten is that as well as risk being negative, it can actually be positive, too. Therefore, perceived negative risks actually open up unseen opportunities; while something believed to be largely positive can fail to have the negative aspect factored in or understood. As applied to aviation, the negative risk of crashing and accidents has paradoxically led to a growing trend of safety improvements as well as security provisions, not only to air transport systems and air-ground movements but also through application into other industries.[30]

The need to "protect" is a human characteristic, whether it is lives or property. Legislation, declarations, and conventions exist – internationally, regionally, and nationally – that enshrine the principle of human rights,[31] both asserting and modifying this premise.[32] In many instances, there is a synergy between a system and a protecting role, which has become part of certain professions – be it from the perspective of an insurer (where a form of compensation is paid due to the risk being insured) or, arguably, from the perspective of policing. It is interesting to note at this juncture that policing is not just synonymous with the police – policing refers to the undertaking by which something is regulated, controlled, or monitored, etc. Whereas, the Collins dictionary defines "policing" (as a noun) as:

- the actions of a person or group in authority in order to ensure fairness and legality in an area of public life; or
- the activities carried out by police officers in order to preserve law and order.[33]

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30 Sarah Jane Fox, *Green and Level Playing Fields: A Paradox of Virtues. DUMPING – Anti-Competitiveness*, 5 Int'l J. Pub. L. & Pol'y 333 (2016).

31 *See, e.g.*, Universal Declaration of Human Rights, G.A. Res. 217A (III), U.N. Doc. A/810 at 71 (1948); (proclaimed by the United Nations General Assembly as a common standard of achievements for all peoples and all nations); Convention for the Protection of Human Rights and Fundamental Freedoms (European Convention on Human Rights), *opened for signature* Nov. 4, 1950, 213 U.N.T.S. 221; Human Rights Act 1998, c. 42 (U.K.).

32 Fox, *supra* note 29.

33 *Policing*, CollinsDictionary.com (2019), https://www.collinsdictionary.com/dictionary/english/policing.

In this latter sense, certainly within the U.K. (England and Wales) the role of the police is recognized to have the following core operational duties (among others), which include:

- protecting life and property;
- preserving order;
- preventing the commission of offenses; and
- bringing offenders to justice.[34]

So perhaps from the perspective of the primary role, to *protect life and property*, it should not be viewed as alien for the police to be directly involved in policing the skies and monitoring legal compliance. This said, over time there has been an expansion of negative risks and hence risk coverage associated with aviation and adjacent global aspects[35] (such as terrorism) – which has seen this separation away from the initial links to policing; whereby insurance is very specific to the growing risks and threats, and the role of a civil authority for aviation has been developed and specialized. That said, certainly in respect to terrorism, this has also necessitated the policing and security services[36] collectively working together to offer another form of protection which runs alongside an evolved insurance regime.[37]

3.1.1. The Risk of Social Media

The advent and development of online media, and particularly social media, has invariably also led to a newer type of risk in terms of the ability both to influence society and to control or direct public opinion. This is particularly relevant in terms of how something is "branded" by the media, which stands to affect a person, company, or a product's reputation, and hence standing, in a market. Not only has it completely changed the way we communicate and share information with one another, social media arguably, also, has overthrown leaders and presidents – it has been cited as the force for grassroots uprisings, such as "Occupy Wall Street," and revolutions, such as the "Arab Spring."[38]

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34 Fox, *supra* note 5.

35 Nejat Capar & Masaaki Kotabe, *The Relationship between International Diversification and Performance in Services Firms*, 34 J. Int'l Bus. Stud. 345 (2003).

36 Sarah Jane Fox, *Policing Aviation and Keeping Peace: Intelligence-Fed Security*, 36 Int'l J. World Peace 63 (2019).

37 Fox, *supra* note 29.

38 *See* Occupy Wall Street, http://occupywallst.org; Anastasia Kavada, *Creating the Collective: Social Media, the Occupy Movement and its Con-*

The 2019 *World Economic Risk – Global Risk Report*[39] categorizes risk into the following sub-divisions:

- Economic
- Environmental
- Geopolitical
- Societal
- Technological

In respect to technology it was identified that "[t]echnology continues to play a profound role in shaping the global risks landscape."[40] Running alongside this was the recognition that there remains a very important and overlapping human side of global risks. For many people, today is an ever "increasingly anxious, unhappy and lonely world."[41] Complex transformations and interactions – through societal and technological, including work-related aspects – are identified as having a profound impact on people's lives and their lived experiences. In this regard, technology is both feared and respected in terms of its benefits and also the risks and challenges that arise.

Technology acceptance, influenced by social media, remains a huge factor and, therefore, a significant, challenge.[42] In the past,[43] when earlier technologies such as the airplane and the car were introduced, social media had none-to-little impact in terms of educating or arguably influencing society as to the positives and negatives of new technology to humanity. If it had, the acceptance of air transport and passenger movements may have

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stitution as a Collective Actor, 18 INFO., COMM. & SOC'Y 872 (2015), https://www.tandfonline.com/doi/abs/10.1080/1369118X.2015.1043318; Julia Skinner, *Social Media and Revolution: The Arab Spring and the Occupy Movement as Seen through Three Information Studies Paradigms* (Sprouts: Working Papers on Information Systems, Working Paper No. 11(169), 2011), http://sprouts.aisnet.org/11-169.

39 WORLD ECONOMIC FORUM, https://www.weforum.org/reports/the-global-risks-report-2019.

40 *Id.*

41 *Id.*

42 Rupak Rauniar, Greg Rawski, Jei Yang & Ben Johnson, *Technology Acceptance Model (TAM) and Social Media Usage: An Empirical Study on Facebook*, 27 J. ENTERPRISE INFO. MGMT. 6 (2014), https://doi.org/10.1108/JEIM-04-2012-0011.

43 Pre-2000, in particular. *See* Yousra Zaki, Opinion, *The Dangers of Social Media That No One Likes to Admit*, GULFNEWS.COM (Sept. 9, 2017, 4:34 PM), https://gulfnews.com/opinion/op-eds/the-dangers-of-social-media-that-no-one-likes-to-admit-1.2087285 (identifying entry into the new millennium as the date that saw this surge of, and in, social media).

been negatively influenced through connotations and linkage to war. There can be little doubt that aviation, particularly aircraft development, is inextricably linked to warfare.[44] The development of drones is no exception. In much in the same way that aircraft owe their development to warfare, so do today's more modern drones.

3.2. *Wars – Automated Planes and Drones*

In 1898, Nikola Tesla filed his patent for the "Method of Apparatus for Controlling Mechanism of Moving Vessels or Vehicles."[45] It related to the militarization and control of unmanned vehicles, and it was one of several predictions that he made while speculating on the potential uses for a remote-control system he was developing at the time.

In the patent, he identified a wide range of possibilities for his new radio-control technology. He envisaged it as

> [n]ew and useful improvements in methods of and apparatus for controlling from a distance the operation of the propelling engines, the steering apparatus, and other mechanism carried by moving bodies or floating vessels, of which the following is a specification, reference being had to the drawings accompanying and forming part of the same.[46]

He identified that:

> Vessels or vehicles of any suitable kind may be used, as life, despatch, or pilot boats or the like, or for carrying letters packages, provisions, instruments, objects . . . but the greatest value of my invention will result from its effect upon warfare and armaments, for by reason of its certain and unlimited destructiveness *it will tend to bring about and maintain permanent peace* among nations.[47]

However, it was not until the First World War (WWI) period that military forces started to experiment with ways to implement Tesla's vision of integrating a radio-controlled system into vari-

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44 Fox, *The Evolution of Aviation: In Times of War and Peace – Blood Tears and Salvation!*, *supra* note 24; Fox, *supra* note 10.

45 *See* U.S. Patent No. 613,809, *supra* note 1.

46 *Id.*

47 *Id.* (emphasis added).

ous types of what were recognized to be "unmanned aircraft."[48] One of the first designs was the Hewitt-Sperry Automatic Airplane, a collaboration between the U.S. Navy and inventors Elmer Sperry and Peter Hewitt, which resulted in a radio-controlled airplane that could be used as a pilotless bomber or flying torpedo. Somewhat in parallel, the U.S. Army commissioned the inventor Charles Kettering to work on another "aerial torpedo" project. This led to the development of the "Kettering Bug," a computerized, auto-piloted biplane.

It remains significant that many of the devices were also named after nature – thus retaining the links that da Vinci had foreseen. After WWI, the British Royal Navy developed a radio-controlled unmanned aircraft, identifying those built as "target drones." And it is the radio-controlled version of the de Havilland Tiger Moth airplane, called the DH.82B Queen Bee, from which the term "drone" is said to have derived.[49]

The Second World War (WWII) saw the introduction of drones in actual combat situations. One particularly feared weapon was Germany's V-1 rocket or flying bomb, known also as the Buzz Bomb or Doodlebug.[50]

It is reputed that during the Cold War era both the U.S. and the USSR used unmanned drones, to some extent, for spying purposes.[51] It is also understood that before (and even since) drone technology was viewed as reliable, nature was harnessed for similar purposes. For example, pigeons were in fact fitted with cameras for surveillance purposes,[52] no doubt only too clearly

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48 Anand Kumar Sethi, The European Edisons: Volta, Tesla, and Tigerstedt (2016).

49 *See de Havilland DH82B Queen Bee*, de Havilland Aircraft Museum, https://www.dehavillandmuseum.co.uk/aircraft/de-havilland-dh82b-queen-bee/; *The Mother of All Drones*, Vintage Wings of Canada, http://www.vintagewings.ca/VintageNews/Stories/tabid/116/articleType/ArticleView/articleId/484/The-Mother-of-All-Drones.aspx.

50 *See Buzz Kill – 13 Remarkable Facts about the V-1 Flying Bomb*, Military History Now, https://militaryhistorynow.com/2015/02/06/buzz-kill-15-amazing-facts-about-the-v-1-flying-bomb/.

51 Matthias Maass, *From U-2s to Drones: U.S. Aerial Espionage and Targeted Killing during the Cold War and the War on Terror*, 34 Comp. Strategy 218 (2015), https://www.researchgate.net/publication/276852250_From_U-2s_to_Drones_US_Aerial_Espionage_and_Targeted_Killing_during_the_Cold_War_and_the_War_on_Terror.

52 This is largely unable to be verified, although reference is made to the possibility of such. *See, e.g.*, *Spy Pigeons*, Air & Space Smithsonian, https://www.airspacemag.com/daily-planet/spy-pigeons-167097967/;

demonstrating the benefit of a small object for airborne observations. Since the early 1980s there has been renewed investment by the U.S. into drone technology. This was undoubtedly as a direct result of the Israelis using military drones against the Syrians so as to minimize the loss of pilot lives.[53]

Typically, drones were used for two main purposes by the military:

(i) combat surveillance, in which a human pilot uses a radio control system to fly a drone to different locations to mark and survey enemy positions; and

(ii) tactical reconnaissance, in which a drone, using a pre-set autopilot system, flies to predesignated targets to take pictures before returning to its home base.

However, since 9/11 drone technology has seen the development of drones directly for offensive action. The General Atomics MQ-1 Predator is now associated with targeted attacks controlled from thousands of miles away via a satellite link. Although it actually began service in 1994, it was not until 2001 that a Predator drone, carrying laser-guided Hellfire missiles, was used in a combat strike in Afghanistan – this invariably marked the dawn of a new era of militarized drones.[54] With this use, the names applied to the drones have become more menacing – such as the Predator, the Reaper, etc. This destructive use by a drone no doubt fulfills the prophecy of Tesla's design, but it remains to be determined whether the second part of the prophecy will be realized and ultimately their use will lead to more peace in the world, or if only further destructive applications result.

Although drones have been used to take lives, this has occurred many thousands of miles away from the originating country. And, while some concerns have been raised as to this new era of military warfare, it is undoubtedly easier to curtail media and social media dissent, which runs parallel to the (positive, prevent-

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Pakistani 'Spy Pigeon' Arrested in India, BBC.CO.UK (May 29, 2015), http://www.bbc.co.uk/newsbeat/article/32928909/pakistani-spy-pigeon-arrested-in-india.

53 Siobhan Gorman, *Drones Get Ready to Fly, Unseen, Into Everyday Life*, WSJ.COM (Nov. 3, 2010, 12:01 AM), https://www.wsj.com/articles/SB10001424052748703631704575551954273159086; Mark Bowden, *How the Predator Drone Changed the Character of War*, SMITHSONIAN, Nov. 2013, http://www.smithsonianmag.com/history/how-the-predator-drone-changed-the-character-of-war-3794671/.

54 Maass, *supra* note 51.

ative) messages emanating from government, in terms of their use being a part of the war on terror and against terrorist regimes. However, this military increase of drone utilization has also led to an increase in civilian drone use.

4. *Non-Military Drones*

The EU has often referred to the fact that drones "*offer huge potential for developing innovative civil applications in a wide variety of sectors that benefit European society, and will contribute to creating new businesses and jobs*."[55] It has been stated that drones open up a "*promising new chapter in the history of aerospace*," whereby "*unmanned aircraft offer a wide range of possibilities for the benefit of European society, ranging from environmental control and security, as well as a fascinating variety of commercial services*."[56] Part of this promotional and opportunistic rhetoric also identifies the ability of drones to perform "*air operations that manned aviation struggle with, and their use results in evident economic savings and environmental benefits whilst reducing the risk to human life.*"[57]

From these statements, it is clear that drone development in a civil application crosses several policy areas (for the EU) in terms of innovation and market development, transport and mobility, and a humanitarian safety/security role.

It is forecast that the European demand will be in excess of €10 billion annually by 2035, and over €15 billion annually by 2050, with the impact of civil missions (either for governments or for commercial enterprises) expected to generate the majority of this value. The other main sectors, defense and leisure, are also anticipated to contribute to this marketplace development.[58] Following on from the military uses, drones have now become associated with a semi-military/security role at the border, whereby border authorities[59] have for some time also been using un-

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55 *Unmanned Aircrafts*, European Comm'n, Internal Mkt., Indus., Entrepreneurship & SMEs, http://ec.europa.eu/growth/sectors/aeronautics/rpas_en (last visited Mar. 11, 2019).

56 *Unmanned Aircraft (Drones)*, European Comm'n, Mobility & Transp., https://ec.europa.eu/transport/modes/air/uas_de (last visited Mar. 11, 2019).

57 *Id. See also* SESAR, *supra* note 20.

58 SESAR, *supra* note 20.

59 For example, drones patrolling the U.S. borders with Mexico and Canada have long been credited as a major contribution to border security. *See*

manned aerial vehicles (UAVs), unmanned combat aerial vehicles (UCAVs), and drone aircraft in their role, that is, to "police" and secure boundaries and borders.[60] Invariably, other sectors also have both a policing and public safety role within society. And, in this respect, a fleet of approximately 50,000 drones has been predicted in the EU, which would provide authorities "like police and fire forces with the means to more efficiently and effectively locate endangered citizens and assess hazards as they carry out civil protection and humanitarian missions."[61]

On top of this, the prediction for use by other commercial and professional sectors utilizing drones conjures up the image of low-level crowded skies in the EU by 2050 – with the majority being linked to the following key sectors, as well as the humanitarian and safety security roles:

- Agriculture sector – over 100,000 drones – to enable precision agriculture, said to help drive increased levels of productivity;
- Energy sector – close to 10,000 drones – to provide infrastructure and preventative maintenance inspections to reduce risk to personnel; and
- Delivery purposes – a potential fleet of nearly 100,000 drones – said to provide society with some kind of urgent service capabilities, "*such as transporting emergency medical supplies*," as well as what are classed as "*premium deliveries.*"[62]

In total, a forecasted fleet of 400,000 drones is expected to be used for commercial and government missions in 2050, with another 7 million consumers using leisure drones.[63]

There is no doubt a role will be played in terms of policing this utilization. The need to have a robust governance structure has been discussed in terms of monitoring, investigating, and prosecuting "drones" and their users.[64] Within the EU this has been suggested to involve a joint role shared between the Civil Avia-

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Bob Orr, *Predator Drones Shift from Battlefield to Border*, CBSNEWS.COM (Nov. 9, 2010, 6:04 PM), www.cbsnews.com/news/predator-drones-shift-from-battlefield-to-border/.

60 Fox, *supra* note 2.

61 SESAR, *supra* note 20, at 4.

62 *Id.*

63 *Id.*

64 Fox, *supra* note 3.

tion Authority (CAA) and the police.[65] In 2015, at Riga, the need was identified for European regulators to ensure that all the conditions for the safe and sustainable emergence of innovative drone services were in position. The Riga Declaration[66] added that there was a need for regulations to help the industry thrive but also to adequately deal with citizens' concerns.[67] Part of this foresaw a need for the police to become involved: "the malicious use of drones cannot be entirely prevented by design or operational restrictions. It is the task of the *national police* and justice systems to address those risks."[68] This said, both the CAA and the police are arguably not prepared for this intensity with no clearly defined role for both parties.[69] This situation is replicated outside the EU – indeed, across the globe – in terms of having the necessary legislation and policies consistently in place for the safe operation of what amounts to a transport system that will "fly" above societies' heads like never before.

However, this is only the first step – but it is nonetheless an important one. It is a step that needs to be firmly cemented to enable sure footing, so as to prevent slippage. That way, it will at least minimize some risk, which needs to parallel public acceptance of this changing technological world that "we" will continue to develop around us. For, according to the EU, in the longer term, the objective is to have larger unmanned commercial vehicles after 2030 – which will first impact cargo transport and then move slowly toward the transportation of passengers. However, as the EU acknowledges in its literature, "[t]he feasibility of such solutions will require significant societal acceptance as well as a number of critical advancements in technology and regulation."[70]

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65 *Id.*

66 Riga Declaration on Remotely Piloted Aircraft (drones) – "Framing the Future of Aviation," Mar. 6, 2015, https://ec.europa.eu/transport/sites/transport/files/modes/air/news/doc/2015-03-06-drones/2015-03-06-riga-declaration-drones.pdf [hereinafter Riga Declaration].

67 *Id.* This was followed up with the Warsaw Declaration, which was built on the guiding principles given in the Riga Declaration and aimed by 2019 to develop a drone ecosystem. *See* Warsaw Declaration – "Drones as a Leverage for Jobs and New Business Opportunities," Nov. 24, 2016, https://ec.europa.eu/transport/sites/transport/files/drones-warsaw-declaration.pdf.

68 Riga Declaration, *supra* note 66, at 4 (emphasis added).

69 As discussed at length in Fox, *supra* note 3. This also sees a comparison analysis between the U.S. and U.K. and the FAA and CAA approaches.

70 SESAR, *supra* note 20, at 4.

4.1. *ICAO: An International Role*

The current treaty governing the international operation of civil aircraft is the 1944 Chicago Convention.[71] That it was written before the end of WWII no doubt influenced the content of the Convention, which clearly and unequivocally confirms the complete and exclusive sovereignty of States over their airspace.

Within the EU, each Member State is a signatory to the Convention; however, collectively, the EU is not – since the EU did not exist at the time. Given the date, it is certainly conceivable that little to no consideration was given to the development of drones and their use.

That said, there is a brief reference to "pilotless aircraft": "*No aircraft capable of being flown without a pilot shall be flown without a pilot over the territory of a contracting State without special authorization by that State and in accordance with the terms of such authorization.*"[72]

There is no doubt that the international stage is far behind the development of related "drone" automated-intelligence technology. Only during ICAO's 39th Assembly in October 2016 was this issue raised when world governments requested that the agency develop a practical regulatory framework for national drone (UAS) activities, in addition to the standards it was already developing for international operations. Without this, a divergence of approaches could develop across the globe. According to ICAO Secretary General Dr. Fang Liu, the "over-riding goal at ICAO is to better define the issues involved, whether technical, operational or legal, and also to ensure safety continues to remain [the] highest priority."[73]

Potentially one approach for public buy-in is to redefine, reimage, and reposition the drone to something which society accepts and indeed embraces – much like the airplane, for example.

A recent decision of the Central District of California in *Philadelphia Indemnity Insurance Co. v. Hollycal Production,*

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71 Convention on International Civil Aviation, *opened for signature* Dec. 7, 1944, 61 Stat. 1180, 15 U.N.T.S. 295 (entered into force Apr. 4, 1947) [hereinafter Chicago Convention].

72 *Id.* art. 8.

73 *See* Press Release, ICAO Issues Call for Innovative Solutions for Drone Airspace Management (Apr. 9, 2018), https://www.icao.int/Newsroom/Pages/ICAO-issues-call-for-innovative-solutions-for-drone-airspace-management.aspx.

Inc.[74] is described as being groundbreaking in its significance, because it is the first to address, in a precedential context, the question as to whether drones are, in fact, aircraft.

The case showed only too clearly the negative risk involved in their use, in terms of the ability to cause injury. The facts of the case related to *Hollycal* – a wedding photography business – and a drone it was using during a reception. This led to serious injury to a guest who lost the sight in one eye. Philadelphia Indemnity initiated a coverage dispute whereby the insurer initially defended Hollycal under a reservation of rights but filed a declaratory action to determine whether the commercial general liability policy it had issued covered drones. Hollycal had previously stated that the drone was not an aircraft because it was "*not capable of transporting persons or cargo*" and had been operated remotely.

However, Judge Percy Anderson held that the aircraft exclusion applied and Hollycal was ordered to reimburse Philadelphia Indemnity for the defense costs already paid.

In doing so, Judge Anderson stated:

> The Policy specifically excludes any bodily injury arising out of the use of an aircraft operated by an insured. While the policy does not define the term "aircraft," the term "aircraft" is unambiguous and its ordinary meaning, as defined by Merriam-Webster's Collegiate Dictionary, is "a vehicle (such as an airplane or balloon) for traveling through the air. . . .
>
> A drone, as a "vehicle . . . for traveling through the air" is an aircraft under the term's ordinary and plain definition. The ordinary definition of an aircraft does not require the carrying of passengers or cargo. Additionally, that a drone is unmanned and operated remotely does not make it any less of an aircraft.[75]

However, Anderson limited his response, confining it to U.S. federal regulations and citing only 14 C.F.R. Section 1.1, defining "aircraft." Going forward, there remain many unanswered ques-

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74 2018 U.S. Dist. LEXIS 211289 (C.D. Cal. Dec. 7, 2018).

75 *Id.* at *10–12 (citations omitted).

tions, not least in terms of who should investigate accidents, collisions, and incidents involving drones and who should monitor their use and compliance with any existing legislation.[76] With the number of drones expected to rise, this is set to be a challenge for the police and the FAA/CAAs in countries across the globe, in terms of policing the skies.[77]

It should be noted that, in terms of the Chicago Convention, contracting States can legitimately protect their territories against unlawful incursions and against perceived risks and dangers. This includes customs regulations, the smuggling of people, and other illegal items. It is acknowledged that this right may also be vested in the military and/or the police, which are both able to utilize aircraft in performance of this function, but outside the Convention's reach. That said, the conduct of "State aircraft" is governed by certain rules of international law and the Convention – particularly that such aircraft "*will have due regard for the safety of navigation of civil aircraft*."[78] For this reason, it is a fundamental requirement that each State be able to train and operate its State aircraft effectively. Therefore, each State aircraft should be provided access to sufficient space, so as to enable adequate opportunities for the training and execution of security, defense, and law enforcement elements.[79] However, there is no global regulatory framework for State aircraft.[80]

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76 *See also* Fox, *supra* note 3, wherein it is further discussed.

77 *Id.*

78 Chicago Convention, *supra* note 71, art. 3(d). *See also* art. 3(b) ("Aircraft used in military, customs and police services shall be deemed to be State aircraft." In broad terms, the right to access all airspace, within the limits of the operational needs, is a crucial requirement to enable the military, customs and police to perform the security, defense and law enforcement missions mandated by their States and by international agreements.).

79 ICAO, Circular 330, Civil/Military Cooperation in Air Traffic Management 17, ICAO Doc. Cir 330 AN/189 (2011) [hereinafter Circular 330]. Circular 330 chapter 5 explains in detail what roles are performed by military and non-military flights under the title of "State aircraft." It also details circumstances when State aircraft can be fully compliant or partially compliant with international civil aviation rules and procedures, as provided for in ICAO SARPs, and it lists the general expectations for handling such aircraft by an air navigation service provider (ANSP). A number of States and international organizations have regulated the operation of State aircraft.

80 This aligns with Article 3 of the Chicago Convention, which recognizes a State's exclusive sovereignty over its airspace.

4.2. *The EU*

The implication of "due regard" was, however, replicated at the EU level, in Regulation No. 216/2008: "This Regulation shall not apply when products, parts, appliances, personnel and organisations referred to in paragraph 1 are engaged in military, customs, police, or similar services."[81]

A newer repealing Regulation[82] arguably extends this further, identifying that it shall not apply to personnel and organizations involved in the operation of State aircraft:

> This Regulation shall not apply to:
>
> 1. (a) aircraft, and their engines, propellers, parts, non-installed equipment and *equipment to control aircraft remotely*, while carrying out military, customs, police, search and rescue, firefighting, border control, coastguard or similar activities or services under the control and responsibility of a Member State, undertaken in the public interest by or on behalf of a body vested with the powers of a public authority, and the personnel and organisations involved in the activities and services performed by those aircraft. . . .[83]

It should be noted that the newer Regulation adds extensively in respect to remotely controlled aircraft, including at Article 3 (definitions), which defines "an 'unmanned aircraft' [as] any aircraft operating or designed to operate autonomously or to be piloted remotely without a pilot on board."[84]

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81 Council Regulation 216/2008, Common Rules in the Field of Civil Aviation and Establishing a European Aviation Safety Agency, and Repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC, 2008 O.J. (L 79) 1.

82 Council Regulation 2018/1139, Common Rules in the Field of Civil Aviation and Establishing a European Union Aviation Safety Agency, and Amending Regulations (EC) No 2111/2005, (EC) No 1008/2008, (EU) No 996/2010, (EU) No 376/2014 and Directives 2014/30/EU and 2014/53/EU of the European Parliament and of the Council, and Repealing Regulations (EC) No 552/2004 and (EC) No 216/2008 of the European Parliament and of the Council and Council Regulation (EEC) No 3922/91 (Text with EEA relevance.), 2018 O.J. (L 212) 1.

83 *Id.* (emphasis added).

84 *See, e.g.*, *id.* sec. VII (Unmanned Aircraft).

This undoubtedly identifies the likelihood, or potential increase, of police utilization of remotely controlled or autonomous devices – such as drones. Not least, it shows the direction for police use of such technology, albeit that it still rests with the Member State to determine. And in this regard, it is also stated that EU Member States may "lay down national rules to make subject to certain conditions the operations of unmanned aircraft for reasons falling outside the scope of this Regulation, including *public security or protection of privacy and personal data in accordance with the Union Law*."[85]

This, therefore, accords the ability for further extensive State deviation for adjacent roles linked to protection – albeit where the emphasis lies on *security*. However, this could also be interpreted, arguably, to encompass safety, as only a fine line distinguishes the two and many languages do not actually have the ability to separate them.[86]

In this regard, it is interesting to note that reference to the protection of privacy and personal data is also cited in terms of the potential to deviate away from compliance with EU laws. Of course, while the implication is that less protection or compliance with privacy and personal data requirements would be permissible, this is phrased in such a way that further protection could actually also be accorded.

5. *Policing the Skies: Obstacles and Challenges*

There remain clear challenges for the police in terms of policing the skies; this includes their own use, and particularly societal acceptance of their use of drones and other advancing technologies.[87]

Custers acknowledged that "[i]ncreasing efforts are made by police forces all over the world to optimize the use of technology in policing and remove any obstacles as new and existing technologies provide new opportunities for law enforcement, criminal investigation and prosecution."[88]

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85 *Id.* art. 56(8) (emphasis added).

86 Fox, *supra* note 29; Fox, *supra* note 28.

87 Fox, *supra* note 5.

88 Bart Custers, *Technology in Policing: Experiences, Obstacles and Police Needs*, 28 Comp. L. & Security Rev. 62 (2012).

So, while there are opportunities there are also obstacles to be negotiated and mitigated. One such obstacle may potentially be viewed as that highlighted by George Orwell, who wrote not about a drone but a helicopter, describing how "in the far distance a helicopter skimmed down between the roofs, hovered for an instant like a bluebottle, and darted away again with a curving flight. It was the Police Patrol, snooping into people's windows."[89]

The Orwell publication, *Nineteen Eighty-Four* (*1984*) coming soon after the end of WWII when there was heightening distrust of the then-Soviet Union, created the scenario of "Big Brother" – where society was being watched. It should also perhaps be commented upon that it was Orwell who first coined the term "Cold War," too, at this time. In *1984*, Big Brother is shown to be Winston Smith, who, as the embodiment of the controlling political party (of the dystopian society of Oceania), can never die. "Big Brother" exists to give the government control over the public by exerting fear of being surveyed, with their every movement monitored.

Yet, despite Orwell, the police use of helicopters is today largely accepted by society and rarely questioned. It could potentially be deduced that this is because helicopters more closely mirror the airplane and this is therefore why society generally accepts them.

There is no doubt as to the capability of helicopters to carry both passengers and cargo, but they also carry other technology, such as thermal imaging and surveillance systems, both of which are utilized in their associated policing role, in terms of protecting society. This role covers a variety of work, such as locating missing persons and preventing and detecting crimes in progress, including providing a presence in the sky to direct colleagues and other services to events and incidents. This necessitates recordings for evidentiary purposes – which could also be termed a form of surveillance.

In England and Wales, the police recognize the benefit of also using fixed-wing aircraft, which can be used for many of the tasks that police helicopters undertake, but offer the additional benefits of a longer flying time and lower running costs. How-

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89 GEORGE ORWELL, NINETEEN EIGHTY-FOUR (1949) (commonly written as "*1984*.").

ever, for some kinds of police work the helicopter remains more suited. Like the airplane, helicopters have a synergy linking their development and use to warfare, but they carry a higher operating cost.

Enter the alternative that increasingly is being used and proposed for such purposes – the unmanned aerial vehicle, the drone.

However, unlike the fixed-wing plane and the helicopter, drones for police use have received constant opposition, and at the very least, scrutiny and justification. It could be due to the fact that, to date, the media reporting of drone usage, and hence the visualization of their use, has largely been attributed to warfare applications (as an aggressor) and/or the fact that the two initial primary purposes for drone use are related to:

(i) combat surveillance; and

(ii) tactical reconnaissance – which is viewed as another form of monitoring.

Depending upon the locality – particularly the country – the police have, in general terms, endured ongoing battles to ensure separation from their military counterparts.[90] It is largely recognized that the U.S. style of policing was initially based upon the U.K. model, which adheres to a system of policing by consent. However, policing, through the utilization of developing technologies, has also been a constant challenge and parallels the political trust that society has for its government, and whether the police are viewed as an extended arm or going hand-in-hand with the government.[91]

In the U.K., it could be argued that there is a greater separation between the police and the government (from that in the U.S.), certainly when it is considered that the U.K. has no "local" police (or comparable Sheriff system) in place. From this perspective, the police swear their allegiance to the monarchy. Nevertheless "trust" remains a key concept of policing and invariably change and development – "it may be viewed as a driver for and enabler of advancement; and yet, conversely, mistrust could be seen to be an obstacle and inhibitor."[92] There remains a struggle in terms of utilizing technology and the associated risks known or perceived, versus the advantage to society. And none more so than from a

90 Fox, *supra* note 5.
91 *Id.*
92 *Id.*

police (utilization) sense, even when applied in the fundamental role of the police – *to protect and ensure safety* – this is often scrutinized and balanced against the fine line of maintaining security and control (the sense of surveillance and monitoring). While the drone (like the helicopter and the fixed-wing plane) is capable of undertaking a multitude of policing roles – one of which remains surveillance, its utilization is often questioned and viewed by many with trepidation. In essence, the focus has become the surveillance capability rather than the transport tool and the overarching benefit to society.[93]

In many ways, this technology is no different than other technology which the police have utilized and which has become acceptable practice on the ground, starting with police cars and other road transport vehicles. From a U.K. perspective, there are certainly parallels to be drawn in terms of body-worn (police) video cameras (BVWs) and dash-mounted cameras, the latter of which have now become common practice among "ordinary" motorists in their commercial or private vehicles. From this perspective, the drone could certainly be positioned as a type of goods-service (motor) vehicle,[94] albeit with one important difference – *it flies*.[95]

In the U.S. in December 2011, a Customs and Border Patrol (CBP) Predator B drone assisted a North Dakota sheriff in locating three gunmen on a 3,000-acre plot of land.[96] This is believed to be the first known occasion of U.S. citizens being arrested with the assistance of a Predator drone. While, to many, this was a

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93 Joaquín Sarrión Esteve, *Actual Challenges for Fundamental Rights Protection in the Use of Drone Technology*, *supra* note 2.

94 The term "motor vehicle" is defined in section 185(1) of the Road Traffic Act 1988 c. 52 (U.K.) and section 136(1) of the Road Traffic Regulation Act 1984 c.27 (U.K.) as "a mechanically propelled vehicle, intended or adapted for use on roads." Although this is the legal definition, ultimately it is a matter of fact and degree for a court to interpret as to whether or not a vehicle is a motor vehicle at the time of any incident. The term "mechanically propelled vehicle" is not defined in the Road Traffic Acts. Again, it remains for the court to determine. At its most basic level, it is a vehicle which can be propelled by mechanical means. It can include both electrically and steam powered vehicles.

95 Fox, *supra* note 3.

96 Brian Bennett, *Police Employ Predator Drone Spy Planes on Home Front*, L.A. Times (Dec. 10, 2011), http://articles.latimes.com/2011/dec/10/nation/la-na-dr one-arrest-20111211.

great show of collaborative service practice, it led to criticism by others.[97]

5.1. *A Question of Aims: Subjective Balance and Human Rights*

The case of *State v. Brossart*[98] raised a further debate as to whether drones stood to compromise or even eviscerate the U.S. Fourth Amendment,[99] the basis of which lies in the roots of the Founding Fathers' desire that the U.S. society should be one in which citizens "dwell in reasonable security and freedom from surveillance."[100] The Fourth Amendment[101] has nonetheless also been the subject of much debate by both practicing attorneys and scholars for decades. As acknowledged by Dressler and Michaels,[102] this has subsequently led to a multitude of interpretations from lower courts through to the Supreme Court.

The U.K., unlike the United States, does not have a written Constitution, although, fundamentally, the same primary protections are accorded to its citizens through an unwritten precedence, which is enforced within the European Convention on

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97 *Id. See also* David Bier & Matthew Feeney, *Drones on the Border: Efficacy and Privacy Implications*, (CATO Inst., Immigration Research and Policy Brief No. 5, 2018), https://www.cato.org/publications/immigration-research-policy-brief/drones-border-efficacy-privacy-implications.

98 No. 32-2011-CR-00049 (D.N.D. July 31, 2012).

99 Thomas Bryan, *State v. Brossart: Adapting the Fourth Amendment for a Future with Drones*, 63 CATH. U. L. REV. 465, 467 (2014), http://scholarship.law.edu/lawreview/vol63/iss2/9; S.H. Blannelberry, *Drone-Aided Arrest Raises Questions About 4th Amendment*, GUNS.COM (June 9, 2012, 4:35 PM), http://www.guns.com/2012/06/09/drone-aided-arrest-4th-amendment; Jason Koebler, *First Man Arrested with Drone Evidence Vows to Fight Case*, U.S. NEWS & WORLD REP. (Apr. 9, 2012), http://www.usnews.com/ news/articles/2012/04/09/first-man-arrested-with-drone-evidence-vows-to-fight-case; *Domestic Drone Justice: US Court Greenlights Police UAV Use*, RUSSIA TODAY (Aug. 3, 2012, 4:51 AM), http://rt.com/usa/domestic-drone-court-ruling-743.

100 Johnson v. United States, 333 U.S. 10, 14 (1948), *quoted in* California v. Ciraolo, 476 U.S. 207, 217 (1986).

101 U.S. CONST. amend. IV ("The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.").

102 JOSHUA DRESSLER & ALAN C. MICHAELS, 1 UNDERSTANDING CRIMINAL PROCEDURE: INVESTIGATION § 6.02, at 68–70 (5th ed. 2010).

Human Rights[103] (ECHR) and the EU Charter of Fundamental Rights.[104,105] These parallel the protections afforded at an international level by the UN Universal Declaration of Human Rights.[106] At a national level, legislation exists in terms of other protections; for example, in England and Wales, the police must act in accordance with the Police and Criminal Evidence Act (PACE).[107]

Taking the ECHR as a comparison with the U.S. Constitution, Article 8 relates to the right to respect for private and family life:

> There shall be no interference by a public authority with the exercise of this right except such as is in accordance with the law and is necessary in a democratic society in the interests of national security, public safety or the economic well-being of the country, for the prevention of disorder or crime, for the protection of health or morals, or for the protection of the rights and freedoms of others.[108]

In many ways, this parallels the role undertaken by the police in regard to ensuring public safety and preventing, or at least minimizing, crime and disorder to ensure a democratic society.

Article 5 of the ECHR relates to the right to liberty and security, and adds support to this in respect of legalities (including the detention of individuals).

Through the use of helicopters, the police have made this task more achievable by providing an eye in the sky in terms of their role and remit. And, in this respect, it should be assumed that

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103 Convention for the Protection of Human Rights and Fundamental Freedoms, Nov. 4, 1950, 213 U.N.T.S. 221 (entered into force Sept. 3, 1950) [hereinafter ECHR].

104 Charter of Fundamental Rights of the European Union, 2010 O.J. (C 83) 389 (adopted in 2000 and binding on EU countries since 2009 – through the Lisbon Treaty).

105 Formed in 1949, the Council of Europe is completely separate from the European Union, with 47 members, compared to the EU's 28. The U.K. became a Council member 24 years before it joined the EU. The U.K.'s membership in the Council would not be affected if it left the EU.

106 G.A. Res. 217, U.N. GAOR, 3d Sess., U.N. Doc. A/810 (1948).

107 Police and Criminal Evidence Act 1984 c.60 ("An Act to make further provision in relation to the powers and duties of the police, persons in police detention, criminal evidence, police discipline and complaints against the police. . . .").

108 ECHR, *supra* note 103, art. 8.

using drones should mirror this, if not enhance it further – in terms of not only results, but affordability.

However, care has to be exercised as to how police drones are used and, more specifically, how they are reported by the media – for there remains the negative risk that the media and social media will focus on the surveillance aspect, and headlines such as this will dominate: *How Police Spied on a Whole City.*[109] This damage was no doubt worsened by the secondary headline and reference by a "sergeant in the L.A. County Sheriff's Department [who] compared the experiment to Big Brother."[110] Phrasing this covert operation as an "experiment" where everyone was watched, as opposed to an identified person or group of persons, does seem to fit with Orwell's vision of a Big Brother state, but if the report is explored further the positive potential of drone use, when done responsibly and in accordance with the primary role of the police (to protect) can be seen. Reference was also made within to the cost and effectiveness issue when it was identified that the system used "costs less than the price of a single police helicopter and costs less for an hour to operate than a police helicopter . . . . But at the same time, it watches 10,000 times the area that a police helicopter could watch."[111]

It is interesting to note that the comparison was made with the helicopter – a largely accepted mode of transport, and not to, perhaps, a static closed-circuit television (CCTV) surveillance system. Like drones, CCTV also monitors indiscriminately – meaning it records everyone who comes within its sights or camera. From this sense it could be concluded that CCTV and drones used in such an all-encompassing manner (as above) do indeed stand to come into conflict with human rights, implicating Article 12 of the UDHR: "No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honour and reputation. Everyone has the

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109 Conor Friedersdorf, *Eyes over Compton: How Police Spied on a Whole City*, The Atlantic (Apr. 21, 2014), https://www.theatlantic.com/national/archive/2014/04/sheriffs-deputy-compares-drone-surveillance-of-compton-to-big-brother/360954/.

110 *Id.*

111 *Id.*

right to the protection of the law against such interference or attacks."[112]

In many ways, this is no doubt where the issues and challenges are perhaps legitimately to be raised and questions asked, in terms of the separation of the police – who as citizens' protectors could be seen to be overstepping boundaries on a large scale.

In this respect, too, care has to be taken on both sides of the Atlantic (and further afield) in terms of media reporting for national or even local deployment of drones, as negative reporting in one country will no doubt impact on utilization and acceptance in other jurisdictions. Such issues were arguably not of concern some 40 or 50 years ago in the same way as they are today.

5.1.1. The U.K.: A Question of "Surveillance" Protection

In the United Kingdom, CCTV has been a common and, therefore, now largely accepted feature of society stemming back to the 1960s.[113] CCTV was used "for the first time by the Metropolitan Police to monitor events or rallies particularly those attended by the Royal Family, or the Prime Minister, while London streets later began to gradually deploy permanent surveillance devices."[114] This deployment later intensified in the 1980s/1990s – the premise being laid that this was a means of protecting society, particularly during a time of heightened conflict in Northern Ireland and fears of further escalation of violence by the Irish Republican Army (IRA) on the British mainland. This message and reasoning for deployment was key – it was, of course, about surveillance, but it was primarily about societal protection – with the secondary objective, namely, the effective means to gather "relevant" intelligence being somewhat less coherently stated. No doubt, to many there is a fine line between these objectives – nevertheless they remain two objectives.

Surveillance technology also therefore has a preventive crime measure function,[115] with Nuth being firmly of the opinion that

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112 At the regional (EU) level, it has been seen that this right to privacy is protected by the European Convention on Human Rights. *See* ECHR, *supra* note 103, art. 8.

113 Fox, *supra* note 5.

114 *Id.*

115 *Id.* (Discussed further within this publication). *See also* Kathy G. Padgett, William D. Bales & Thomas G. Blomberg, *Under Surveillance: An Em-*

CCTV was introduced with the intention of this – namely, to reduce crime.[116] If viewed from this perspective, it could be interpreted that it has principally been successful in achieving this overarching aim or mission, certainly from a U.K. perspective.

An evolutionary development of this technology is a mobile system; and in this respect, it has become commonplace over the last five years for patrolling police officers in the U.K. to be outfitted with BVWs – cameras that have the facility to record. And, though not filming constantly, they are operated when events need to be captured as evidence. In this regard, they aid to protect both the public and the police. However, like so much of the technology used by the police, concerns have been raised in terms of infringements to personal liberties. Police vehicles also have similar technology to monitor and record offenses; however, this has resulted in less controversy.[117] This is perhaps ironic, considering the next stage of technological development in terms of transportation systems, for a similar purpose, remains the drone and artificial intelligence.

The police service in the U.K. is based upon the principle of democratic policing – where it is undertaken by and with the consent of the public. Sir Robert Peel, who is attributed with being the founder of the modern police service (a model adopted in many countries outside the U.K.) said that "*the police are the public and the public are the police*."[118] From this perspective, it should be reinforced that police officers are a part of the wider society and therefore should not be viewed as only a sub-sect. In other words, they stand to be equally affected by law, policies, or decisions. Additionally, technology that becomes readily available to society stands to be used by the police, and therefore against the police. So, while there have been some concerns over the use of surveillance or recording technology, the police have equally, if not more so, found themselves on the other side of the equation – whereby in the lawful execution of their sworn duties

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pirical Test of Effectiveness and Consequences of Electronic Monitoring, 5 Criminology & Pub. Policy 61 (2005).

116 Maryke Silalahi Nuth, *Crime and Technology – Challenges or Solutions? Taking Advantage of New Technologies: For and Against Crime*, 24 Computer L. & Security Rep. 437 (2008).

117 Fox, *supra* note 5.

118 *See* Police Fed'n of Eng. & Wales, Your Police Service: Putting the Public First, http://www.polfed.org/Putting_the_public_first.pdf (last visited Mar. 12, 2019).

they find themselves filmed – most commonly on mobile phones (as well as the suspect or anyone else they are interacting with). Hence if there are privacy issues that need to be answered, are the same not true for when the police are filmed or recorded? Or is it a case of, if there is nothing to hide – there is nothing to fear?

5.1.2. A Question of Trust!

It should be a fundamental principle that technology used by the police should be used to protect society and keep "its" citizens (the population) safe and secure (by minimizing crime or the risk of it). Ultimately, it remains a question of trust, which will vary across society and within countries. This will be linked to a legacy – no doubt – which links to both a military separation and also to the ruling parties and therefore what has been experienced within a country.

Returning to a U.K. perspective, the police oath states that the police serve the crown and that the role is undertaken with "fairness, integrity, diligence and impartiality, upholding fundamental human rights and according equal respect to all people."[119]

However, this has to be both exhibited and believed, and while emphasis is now clearly accorded to the principles and standards for professional policing – trust of the citizens remains a challenge, even if it is a minority percentage that has distrust. In many ways, this is not dissimilar to the experience of aviation and the development of air rights, or freedoms, in this case, in the air. In 1944, in Chicago (when the current Convention was being formulated), trust and willingness to accept movements across other nations' sovereign air space was a contentious issue.[120] In 2019, arguably the same fundamental arguments remain true in respect of the drone. While drones may fly across jurisdictions and boundaries, there are perhaps more pressing dilemmas and questions to be answered internally – including with regard to policing home skies. And, invariably, as part of the same discussions, the police use of drones. Many of the risks and fears of airplane use are the same in respect to the drone. Advanced drone technology exists today and this is only going to become more sophis-

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119 Police Reform Act 2002, c. 30, § 83 (replacing Schedule 4 to the Police Act 1996 (§ 29) (U.K.).

120 Fox, *The Evolution of Aviation: In Times of War and Peace – Blood Tears and Salvation!*, *supra* note 24; Fox, *supra* note 10.

ticated in the future. Without a shadow of doubt, mechanisms and governance systems need to be put in place to protect citizens from those who would maliciously use this technology in a negative way to cause harm,[121] and it will need to factor in the police utilization of drones.

In the U.K., the police are increasingly using drones as part of their everyday role, and similarly to how CCTV was routinely introduced, the emphasis is being directed toward how the technology is enhancing the police in their "protective" role. Challenges clearly exist, but so do opportunities accorded by their use. As part of this, comment has been made as to how the respective police services have carefully and skillfully managed this – clearly articulating and emphasizing in the media and on their social media sites when lives have been saved through the deployment of drones.[122] As much as possible, utilization of drones for a policing purpose has been compatible with domestic legislation,[123] plus the direction emanating from the EU.[124] Deviation from this, and reverting to emergency services exemptions, has been limited and at least carefully considered before being applied. The number of police forces in England and Wales listed as commercial operators of drones (SUAs[125]) has noticeably increased on a yearly ba-

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121 Fox, *supra* note 2; Sarah Jane Fox, *Flying Challenges for the Future: Aviation Preparedness – in the Face of Cyber-Terrorism*, 9 J. Transp. Security 191 (2016).

122 Fox, *supra* note 5.

123 Fox, *supra* note 3. Within this publication discussion is given to the new 2018 legislation in the U.K. and EU (e.g. The Air Navigation (Amendment) Order 2018 (SI. c623). Some articles of the amendment came into force on July 30, 2018, but others will take a further 16 months, coming into force on November 30, 2019.). This amended the Navigation Order (ANO) 2016. Note that as of February 20, 2019, the United Kingdom government published a further amendment to the U.K. Air Navigation Order 2016 (ANO) – which was amended in 2018 and 2017. This contains additional changes to the legislation regarding the operation of small unmanned aircraft ("Small unmanned aircraft" means any unmanned aircraft, other than a balloon or a kite, having a mass of not more than 20kg without its fuel but including any articles or equipment installed in or attached to the aircraft at the commencement of its flight.). Civil Aviation Auth., CAP1763 – Air Navigation Order 2018 and 2019 Amendments – Guidance for Small Unmanned Aircraft Users (Feb. 2019) (U.K.) (covering the small unmanned aircraft related articles within the Air Navigation Order that will remain relevant after the newer March 13, 2019 amendment, which replaces CAP 1687).

124 Fox, *supra* note 3.

125 Aircraft not exceeding 20kg.

sis; however, this is still a minority of the 43 such services that exist in England and Wales.

The police know that they face scrutiny and accountability, and care has been taken to ensure that appropriate and professional training has been given to drone remote pilots and operators. However, if this is not followed around the globe there is likely to be a negative backlash as increasingly media and social media influence their audiences with their persuasion being exerted on other countries' populations.

So what does the future hold for drones and their use above our heads?

Trust is two-way. Despite technology being in place that allows drones to be pre-programed (as has occurred in military operations), legislation in the U.K. prevents non-military drones from being operated by the remote pilot outside the visual line of sight, and stringent restrictions remain in place (and arguably increase) in terms of where drones can and cannot be operated.[126] However, while this may stand to impede the legal use of drones as

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[126] Fox, *supra* note 3. Briefly summarized:

1. Regulations state that:
   a. Drones must be flown in a safe manner
   b. Drone must be kept in the operator's direct sight at all times while it is flying (so that it can be ensured that it does not collide with anything, especially other aircraft)
   c. It must not endanger anyone, or anything, (restrictions are placed on dropping articles from it)
   d. It must not be flown more than 400ft above the surface. If flying over hilly/undulating terrain or close to a cliff edge, this may be interpreted as being a requirement to remain within a distance of 400ft from the surface of the earth
   e. It must not be flown within the Flight Restriction Zone of a protected aerodrome
   f. If the drone weighs more than 7kg, additional rules apply if you fly in certain types of airspace.

   And,
2. *If the drone is fitted with a camera*, there are also a number of additional limitations surrounding where it can/cannot be flown, and how close it can fly it to other uninvolved people or objects. In order to be able to fly within these areas, or closer than the minimum distances that are in the regulations, prior permission from the CAA MUST be obtained.

See Recreational Drone Flights: How the Regulations Apply to You, Civil Aviation Auth., https://www.caa.co.uk/Consumers/Unmanned-aircraft/Recreational-drones/Recreational-drone-flights/ (last visited Apr. 18, 2019).

envisaged by the EU, this does not prevent illegal operations that have no respect for the law.[127]

6. *Conclusion*

Returning to Tesla's full quote, it can be shown that he recognized the powerful potential of his invention when he acknowledged (in his patent) that, "the greatest value of my invention will result in its effect upon *warfare* and armaments, *for by reason of its certain and unlimited destructiveness*, it will tend to bring about and maintain permanent peace among nations."[128]

There is no doubt as to the destructive capability of the drone – this has been proven but arguably not to its full destructive degree, which according to Tesla, is *unlimited.* Viewed from this perspective there are clear connotations and associations with nuclear capability. Indeed, there is a clear feasibility that a drone (or a swarm of drones) would be able to deliver nuclear bombs or some other menacing mechanism to hurt or even destroy mankind.

Once technology has been invented it is difficult, if not impossible, to remove it (or put it back in its box) – *you can't undo what is known and exists.*

In terms of nuclear bombs, this is arguably different from the drone – they were built with a clear negative intention – *destruction;* and, as a consequence they have become a deterrent – a device to prevent wars. Tesla's remarks tend to indicate that this is where he would potentially position the drone and, in doing so, bring about world peace.

However, stopping nuclear weapons and positioning them as a deterrent is also easier – assembly of such is more difficult than a drone in terms of parts, ease of doing so, and movement. And, whereas, a nuclear device has a primary "destructive" intention, it is clearly recognized that there are immense opportunities for drones to aid and to benefit mankind – preventing their use would in fact result in negative consequences. Hence, positioning of the drone remains key in terms of ensuring that any risk has a positive outcome.

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127 Fox refers to this in her previous publications. *See* Fox, *supra* note 2; Fox, *Flying Challenges for the Future*, *supra* note 121; Fox, *supra* note 5; Fox, *supra* note 3.

128 U.S. Patent No. 613,809, *supra* note 1 (emphasis added).

There is no doubt that the third decade of the 21st century (and beyond) will be challenging in terms of ensuring that advancing technologies such as the drone and AI are used to assist the human species. The skies remain vulnerable in this respect, in terms of accidents, unforeseen incidents, and actions that are purposely aimed to cause fear and destruction. And drones have the capabilities to be both an aggressor and a savior. Regardless of global events, it is unlikely that the development of drones will cease but this means ensuring that the correct governance and protective systems are in place. This means trusting those who have this remit – such as the police – to use advancing technology, i.e. drones, in their role and capacity as officers who uphold the law, which encompasses civil protections and our rights. There will remain ongoing challenges in terms of balancing individual rights with safety, and particularly security needs. While negative uses for drones can occur, it is essential that we recognize and steer toward their positive uses. That said, while there is the possibility of abuse and misuse, it remains unlikely that they will be used in perhaps the way or volume that the EU envisages. There is certainly a role for them in terms of remote locations and their use where there would otherwise be risk (or too high a risk) to humans. However, everyday use for purposes such as parcel delivery needs to be carefully thought through in terms of protection (legislative and civil) and the erosion of liberties, e.g. privacy and overflight of private curtilage (particularly houses and dwellings). If this is incorrectly approached and rolled out, then their use for humanitarian and lifesaving missions – which includes by the police – stands to be seriously compromised.

So will there be police drone squads? Yes and no. There is clearly a role to be undertaken by the drone in police work but this will require careful management. Primarily there will be an increasing role and responsibility in terms of policing the drone arena, by the police, together with the CAA/FAA authorities. Training and education, both of the public and the police, is essential. It will be critical for all police to have an increased knowledge and awareness of the capabilities, uses, and their powers relating to drones – much in the same way as has occurred with motor vehicles.

Trust needs to be developed and demonstrated with positive outcomes. And it should also be noted that as police use increases, it is likely that civil use will, too.

It is therefore anticipated (and indeed hoped, for this very reason) that the use of drones by the police will remain more limited and specialized, certainly until we approach the 22nd century.